Chapter 5. Radar

Section 1. General

5-1-1. PRESENTATION AND EQUIPMENT PERFORMANCE

Provide radar service only if you are personally satisfied that the radar presentation and equipment performance is adequate for the service being provided.

NOTE-
The provision of radar service is not limited to the distance and altitude parameters obtained during the commissioning flight check.

5-1-2. ALIGNMENT ACCURACY CHECK

During relief briefing, or as soon as possible after assuming responsibility for a control position, check the operating equipment for alignment accuracy and display acceptability. Recheck periodically throughout the watch.

REFERENCE-
FAAO 7210.3, Chapter 3, Chapter 8, Chapter 9, Chapter 10, and Chapter 11.
Comparable Military Directives.

TERMINAL

a. Check the alignment of the radar video display by assuring that the video/digital map or overlay is properly aligned with a permanent target of known range and azimuth on the radar display. Where possible, check one permanent target per quadrant.

b. Accuracy of the radar video display shall be verified for digitized radar systems by using the moving target indicator (MTI) reflectors, fixed location beacon transponders (Parrots), beacon real-time quality control (RTQC) symbols or calibration performance monitor equipment (CPME) beacon targets.

REFERENCE-
FAAO 7210.3, Tolerance for Radar Fix Accuracy, Para 3-8-1.

EN ROUTE

c. When operating in the narrowband mode (Stage A) alignment checking is accomplished by the operational program as part of the certification procedures for system startup and then on a real-time basis during operational hours.

d. When operating in the EDARC/DARC/HOST or EDARC/DARC mode, ensure the PVD/MDM center and altitude limits for the system are appropriate for the operating position.

REFERENCE-
FAAO 7110.65, Selected Altitude Limits, Para 5-14-5.

5-1-3. RADAR USE

Use radar information derived from primary and secondary radar systems.

REFERENCE-
FAAO 7110.65, Beacon Range Accuracy, Para 5-1-4.
FAAO 7110.65, Inoperative or Malfunctioning Interrogator, Para 5-2-15.

a. Secondary radar may be used as the sole display source as follows:

1. In Class A airspace.

REFERENCE-
FAAO 7110.65, Failed Transponder in Class A Airspace, Para 5-2-16.
14 CFR Section 91.135, Operations in Class A Airspace.

2. Outside Class A airspace, or where mix of Class A airspace/non-Class A airspace exists, only when:

(a) Additional coverage is provided by secondary radar beyond that of the primary radar.

(b) The primary radar is temporarily unusable or out of service. Advise pilots when these conditions exist.

PHRASEOLOGY-
PRIMARY RADAR OUT OF SERVICE. RADAR TRAFFIC ADVISORIES AVAILABLE ON TRANSPONDER AIRCRAFT ONLY.

NOTE-
1. *Advisory may be omitted when provided on ATIS and pilot indicates having ATIS information.*

2. *Advisory may be omitted when there is overlapping primary radar coverage from multiple radar sites.*

(c) A secondary radar system is the only source of radar data for the area of service. When the system is used for separation, beacon range accuracy is assured, as provided in para 5-1-4, Beacon Range Accuracy.

NOTE-
1. *This provision is to authorize secondary radar only operations where there is no primary radar available and the condition is temporary.*

2. *Since Terminal facilities use Long Range Radar, this is applicable to En Route and Terminal Radar Facilities.*

b. *TERMINAL.* Do not use secondary radar to conduct surveillance (ASR) final approaches unless the system is fully digitized, or an emergency exists and the pilot concurs.

5-1-4. BEACON RANGE ACCURACY

a. You may use beacon targets for separation purposes if beacon range accuracy is verified by one of the following methods:

NOTE-
1. *The check for verification of beacon range accuracy accomplished by correlation of beacon and primary radar targets of the same aircraft is not a check of display accuracy. Therefore, it is not necessary that it be done using the same display with which separation is being provided, nor the same targets being separated.*

2. *Narrowband: Beacon range accuracy for automated narrowband display equipment is verified by AF personnel. Consequently, further verification by the controller is unnecessary.*

1. Correlate beacon and primary targets of the same aircraft (not necessarily the one being provided separation) to assure that they coincide.

2. When beacon and primary targets of the same aircraft do not coincide, correlate them to assure that any beacon displacement agrees with the specified distance and direction for that particular radar system.

3. Refer to beacon range monitoring equipment where so installed.

b. If beacon range accuracy cannot be verified, you may use beacon targets only for traffic information.

REFERENCE-
FAAO 7110.65, Radar Use, Para 5-1-3.

5-1-5. ECM/ECCM ACTIVITY

a. Refer all ECM/ECCM activity requests to the appropriate center supervisor.

REFERENCE-
FAAO 7610.4, Chapter 2, Section 7, Electronic Counter Measures (ECM) Missions/Exercises.

NOTE-
ECM activity can subsequently result in a request to apply ECCM videos to the radar system which may necessitate the decertification of the narrowband search radar. The Systems Engineer should be consulted concerning the effect of ECM/ECCM on the operational use of the narrowband radar prior to approving/disapproving requests to conduct ECM/ECCM activity.

b. When ECM activity interferes with the operational use of radar:

1. *EN ROUTE.* Request the responsible military unit or aircraft, if initial request was received directly from pilot, to suspend the activity.

2. *TERMINAL.* Request suspension of the activity through the ARTCC. If immediate cessation of the activity is required, broadcast the request directly to the ECM aircraft on the emergency frequency. Notify the ARTCC of direct broadcast as soon as possible.

c. When previously suspended activity will no longer interfere:

3. *EN ROUTE.* Inform the NORAD unit or aircraft that it may be resumed.

4. *TERMINAL.* Inform the ARTCC or aircraft that it may be resumed. Obtain approval from the ARTCC prior to broadcasting a resume clearance directly to the aircraft.

d. In each stop request, include your facility name, type of ECM activity (chaff dispensing- "stream"/ "burst" or electronic jamming- "buzzer"), radar band affected and, when feasible, expected duration of suspension.

PHRASEOLOGY-
BIG PHOTO (identification, if known) (name) CENTER/ TOWER/APPROACH CONTROL.

To stop ECM activity:

STOP STREAM/BURST IN AREA (area name) (degree and distance from facility),

or

STOP BUZZER ON (frequency band or channel).

To resume ECM activity

RESUME STREAM/BURST,

or

RESUME BUZZER ON (frequency band or channel).

5-1-6. SERVICE LIMITATIONS

a. When radar mapping is not available, limit radar services to:

1. Separating identified aircraft targets.

2. Vectoring aircraft to intercept a PAR final approach course.

3. Providing radar service in areas that ensure no confliction with traffic on airways, other ATC areas of jurisdiction, restricted or prohibited areas, terrain, etc.

b. *EN ROUTE.* Stage A and DARC- When the position symbol associated with the full data block falls more than one history behind the actual aircraft target or there is no target symbol displayed, the Mode C information in the full data block shall not be used for the purpose of determining separation.

c. Report radar malfunctions immediately for corrective action and for dispatch of a Notice to Airmen. Advise adjacent ATC facilities when appropriate.

REFERENCE-
FAAO 7110.65, Reporting Essential Flight Information, Para 2-1-9.
FAAO 7210.3, Chapter 3, Chapter 7, Chapter 10 Section 5, and Chapter 11 Section 2.

5-1-7. ELECTRONIC CURSOR

TERMINAL

a. An electronic cursor may be used to aid in identifying and vectoring an aircraft and to give finer delineation to a video map. Do not use it as a substitute for a video map or map overlay; e.g., to form intersections, airway boundaries, final approach courses, etc.

b. Fixed electronic cursors may be used to form the final approach course for surveillance approaches conducted by military operated mobile radar facilities.

5-1-8. MERGING TARGET PROCEDURES

a. Except while they are established in a holding pattern, apply merging target procedures to all radar identified:

1. Aircraft at 10,000 feet and above.

2. Turbojet aircraft regardless of altitude.

REFERENCE-
P/CG Term- Turbojet Aircraft.

3. Presidential aircraft regardless of altitude.

b. Issue traffic information to those aircraft listed in subpara a whose targets appear likely to merge unless the aircraft are separated by more than the appropriate vertical separation minima.

EXAMPLE-
"Traffic twelve o'clock, seven miles, eastbound, MD-80, at one seven thousand."

"United Sixteen and American Twenty-five, traffic twelve o'clock, one zero miles, opposite direction, eastbound seven twenty seven at flight level three three zero, westbound MD-Eighty at flight level three one zero."

c. If the pilot requests, vector his/her aircraft to avoid merging with the target of previously issued traffic.

NOTE-
Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

d. If unable to provide vector service, inform the pilot.

5-1-9. HOLDING PATTERN SURVEILLANCE

Provide radar surveillance of outer fix holding pattern airspace areas, or any portions thereof, shown on your radar scope (displayed on the video map or scribed on the map overlay) whenever aircraft are holding there. Attempt to detect any aircraft that stray outside the area. If you detect an aircraft straying outside the area, assist it to return to the assigned airspace.

5-1-10. DEVIATION ADVISORIES

Inform an aircraft when it is observed in a position and on a track which will obviously cause the aircraft to deviate from its protected airspace area. If necessary, assist the aircraft to return to the assigned protected airspace.

REFERENCE-
FAAO 7110.65, Route or Altitude Amendments, Para 4-2-5.
FAAO 7110.65, Methods, Para 7-9-3.

5-1-11. RADAR FIX POSTING

EN ROUTE

A controller is required to manually record at least once the observed or reported time over a fix for each controlled aircraft in their sector of responsibility only when the flight progress recording components of the HOST/DARC or the EARTS systems are not operational.

REFERENCE-
FAAO 7210.3, Flight Progress Strip Usage, Para 6-1-6.
FAAO 7210.3, Flight Progress Strip Usage, Para 10-1-8.

5-1-12. POSITION REPORTING

If necessary, you may request an aircraft to provide an estimate or report over a specific fix. After an aircraft receives the statement "radar contact" from ATC, it discontinues reporting over compulsory reporting points. It resumes normal position reporting when ATC informs it "radar contact lost" or "radar service terminated."

REFERENCE-
P/CG Term- Radar Contact.

a. When required, inform an aircraft of its position with respect to a fix or airway.

PHRASEOLOGY-
OVER/PASSING (fix).

(Number of miles) MILES FROM (fix).

(Number of miles) MILES (direction) OF (fix, airway, or location).

CROSSING/JOINING/DEPARTING (airway or route).

INTERCEPTING/CROSSING (name of NAVAID) (specified) RADIAL.

5-1-13. RADAR SERVICE TERMINATION

a. Inform aircraft when radar service is terminated.

PHRASEOLOGY-
RADAR SERVICE TERMINATED (nonradar routing if required).

b. Radar service is automatically terminated and the aircraft needs not be advised of termination when:

NOTE-
1. *Termination of radar monitoring when conducting simultaneous ILS/MLS approaches is prescribed in para 5-9-7, Simultaneous Independent ILS/MLS Approaches- Dual & Triple.*

2. *Termination of radar monitoring where PAR equipment is used to monitor approaches is prescribed in para 5-13-3, Monitor Information.*

1. An aircraft cancels its IFR flight plan, except within Class B airspace, Class C airspace, TRSA, or where basic radar service is provided.

2. An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

3. At tower-controlled airports where radar coverage does not exist to within $^1/_2$ mile of the end of the runway, arriving aircraft shall be informed when radar service is terminated.

REFERENCE-
FAAO 7210.3, Radar Tolerances, Para 10-5-6.

4. *TERMINAL.* An arriving VFR aircraft receiving radar service to a tower-controlled airport within Class B airspace, Class C airspace, TRSA, or where basic radar service is provided has landed, or to all other airports, is instructed to change to tower or advisory frequency.

5. *TERMINAL.* An aircraft completes a radar approach.

REFERENCE-
FAAO 7110.65, Service Provided When Tower is Inoperative, Para 7-6-12.